

OBSERVATIONS

ON

CONTAGION.

SECOND EDITION,

CORRECTED AND ENLARGED BY ORIGINAL COMMUNICATIONS.

BY WHITLEY STOKES, M. D.

HONORARY FELLOW OF THE COLLEGE OF PHYSICIANS,
LECTURER ON NATURAL HISTORY TO THE UNIVER-
SITY OF DUBLIN, LATE SENIOR FELLOW OF
TRINITY COLLEGE, AND LATE PROFESSOR
OF THE PRACTICE OF MEDICINE.

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OBSERVATIONS

ON

CONTAGION, &c.

AS various significations have been attached to the words Infection and Contagion, I think it best to declare what I mean by the latter of these terms: I would denote a substance produced on the body of an animal diseased, which will, if applied in considerable quantity to the body of a healthy animal of the same species, give rise to a similar disease. That such a substance is the cause of Small-pox, Measles, the Venereal Disease, Itch, and Cow-pock, cannot be doubted. In instances without number, in each of these diseases the matter taken from one morbid human creature has been applied to the skin of another in health, and a disease has been produced resembling the parent affection. Many of the persons so affected were in such circumstances that there was no ground for supposing that any other cause capable of producing such a disease had operated upon them. Indeed, from the history of

the general progress of these diseases, we ought not readily to admit the supposition that they had been produced by any of the common causes of disease which operate on mankind at large. We know that, for many centuries after the Christian æra, Europe was not infested by the Venereal Disease, Small-pox or Measles, and that to this day many nations exist whom those maladies have not reached, or whom they have visited only occasionally.

Some diseases are generally reputed contagious, as Small-pox, Measles, Hooping Cough, Scarlet Fever, the Venereal Disease, the Itch, the Plague, the Egyptian Ophthalmia, and Cow-pock by inoculation ; in some the contagious nature is disputed, as in Typhus Fever and the Yellow Fever ; in some others doubts naturally rise, as in Dysentery and Catarrh.

Some advantages appear likely to arise from taking a general view of the circumstances of Contagion, as deduced from various diseases. The objections which have been relied upon against the existence of Contagion in certain fevers, will lose much of their force if we can shew that similar circumstances are observed, though in a less degree, in those diseases which all acknowledge to be contagious, and the laws of Contagion, which may appear doubtful, when we attempt to deduce them from one or two species of diseases, appear to assume increasing regularity, as our views extend.

I shall now proceed to give proofs of the con-

tagious nature of Plague, from some of the best published accounts of the disease. Few, indeed, doubt that the Plague is infectious; but as the analogy between the Plague and Typhus may strengthen the arguments for the contagious nature of the latter disease, it seems advisable to recal to men's minds the proof of the Contagion of Plague.

That the Plague is infectious I think is amply proved from this circumstance, that those who are carefully secluded escape the disease. Thus, in the very severe epidemic of the Plague at Marseilles, in the beginning of the last century, those monks who shut themselves up in their convents escaped. "If," says Russel, "persons retired from all commerce with the infected and their attendants, breathing the same air with the rest of the inhabitants, and nourished by the same aliment, remain untouched by the ravage of the Plague, so long as they continue secluded, but upon unguarded communication are taken ill like others, can any rational doubt arise about the cause of their former security? Or, if through stealth or neglect of the necessary precautions, substances tainted by the sick should be conveyed into these secluded retreats, and persons living temperately, as before, ignorant of what had happened, and in the midst of imaginary security, should happen to be seized with the distemper, can it with any shew of reason be ascribed not to Contagion, but to terror, or to colluvies in the

stomach or bowels, produced by bad aliment ?” Such instances as those alluded to by Dr. Russel, are afforded by the continual experience of various cities which have been visited by the Plague. In the mercantile towns in the Levant, the established practice with the European residents is, to shut up their houses on the first appearance of the Plague, and to receive provisions with certain precautions ; and so uniformly successful is this practice, when strictly adhered to, that Russel asserts “ a case could hardly be specified in which a secluded family had been affected, where the mischief could not be traced to some violation of the rules of confinement : and if a few cases occur which cannot be so accounted for, he must be an unreasonable man” says Dr. Russel, “ who will contend that no concealed breach of rules, or casual and forgotten imprudence, had introduced Contagion.” When we recollect how perpetually we are in want of the communication of society for every article we use, it seems more wonderful that any families living in a town, and in the habits of perpetual communication, should submit to seclusion, than that this should be often violated. Murtens, by strict attention, preserved the Foundling Hospital at Moscow, containing a thousand persons, so completely, that not one died of the Plague, although great numbers died daily, for some months, in the city.

It was repeatedly observed in Russia, that the progress of the Plague was entirely checked in small towns

by the timely vigilance of the magistrates, and submissiveness of the people ; but that in large cities, where there were powerful persons who could not be compelled to submit to the regulations, the mischief took its course. The authorised reports of the Physicians and Surgeons at Marseilles, give strong positive proof of the infectious nature of the Plague. In one of these reports they unanimously declare, that when one person of a family was attacked by the Plague, and died, the rest soon received the disease, in so much that there were instances of entire families destroyed in that manner ; and if any one of an infected family fled to another house, the contagion accompanied him, and displayed itself in the family in which he had taken refuge. The first hospital opened for the infected at Marseilles proved fatal to all the attendants. The introduction of the plague into the Hotel-Dieu, in that city, was traced to a woman received as a patient from the very street where the plague first broke out. Two of the nurses who assisted at her reception, and the matron who changed her linen, were taken sick next day, and died after a few hours illness : the contagion spreading from them, destroyed the physicians, surgeons and apothecaries, with all the other officers and servants of the house, the clergyman who attended the infected, and the whole of the patients in the Hospital. At the same city the beggars were seized by force, and employed to bury the dead, but were all soon consumed by so dangerous a labour ; they seldom survived above two days, so that the magistrates were

forced to have recourse to the galley-slaves for the same purpose.

Monsieur Deidier, one of the physicians sent to Marseilles towards the decline of the epidemic, was of opinion, at first, that the Plague was not infectious. His argument was, that he himself had never taken it. But we know that contagions, whose existence is most certain, are occasionally innocent to particular constitutions. Monsieur Deidier, however, gave up his opinion, upon the result of an extraordinary experiment. He inoculated several dogs with the bile of persons who died of the Plague, and the dogs were seized with the symptoms of that disease. But this experimenter demanded more than should have been necessary to satisfy, for surely a disease may be deemed contagious which can be propagated from one to another of the same species, although it should fail to affect individuals of another.

Mr. White, who accompanied the army led by General Abercrombie into Egypt, left Europe with a strong prepossession that the Plague was not contagious. He wrote to his friends from the East, that he would have been able to have sent them satisfactory proofs of his opinion, but for the obstinate prejudices of the Turks, who refused to admit him into the Hospitals where persons labouring under the Plague were confined. He afterwards procured some matter from a person labouring under the Plague, with which he inoculated himself twice with

impunity, but on repeating the experiment a third time, he took the disease, and died after a short illness. There is reason to suppose that this experiment was repeated by at least one person more with the same fatal event.

Mr. West, now Surgeon of the 27th Regiment, which is quartered at present in the Royal Barracks, did me the honour to communicate several observations which he had made on the Contagion of the Plague, and the treatment of that formidable disease. He was ordered to take the charge of a Peste Hospital near Rosetta, in the beginning of May 1801, and shut up with a succession of patients for four months. He had with him an Assistant, an Italian medical man, an English soldier who acted as steward, and Arab servants. No one of the party took the disease, although Mr. West opened and dressed the buboes himself, and dressed sores from Anthraxes, so extensive that half a pound of flesh came off sometimes by sloughing, and although the servants washed the sheets, bedding and bandages, rubbed the patients with mercury extensively, supported the faint, tied the delirious, buried the dead; in short, they were exposed as extensively as possible to Contagion.

The Plague was at that time so severe that, in the Village of Dousough, about twenty-five miles from Rosetta, containing nearly four hundred inhabitants, the fourth part are said to have died in a month, and other villages were also severely affected. For the

knowledge of these facts respecting the prevalence of Plague about Rosetta I am obliged to Colonel Warren, of the 27th Regiment, who was quartered there in May 1801 ; and to his politeness I am also indebted for my introduction to Mr. West, and the advantages of his information in revising this essay.

The escape of Mr. West's party was very remarkable ; but as it is of particular consequence to my argument, to shew that even the Contagion of Plague often fails of producing the disease, I shall mention some other observations of Mr. West to the same point.

The Plague appeared in the wife of Serjeant Hartley of the 44th Regiment ; her husband and child were sent with her, it being supposed that they were affected. She recovered, they escaped taking the disease.

Surgeon Halliday, of the 27th, was seized with the Plague on the 10th of June 1801, in a very severe manner ; he was removed on the following day to the Peste Hospital, under the charge of Mr. West, at his own desire. He was attended from his quarters in Rosetta, to the gates of the Hospital, by Lieutenants Tuthill and Galbraith, and into the hospital by his servant, who suffered much fatigue in attending him, in rubbing him three times a-day with mercury, in restraining him from hurting himself during his delirium, and who assisted Mr. West to bury his body, yet neither the officers nor this servant took the disease.

Mr. West's observations on the treatment of the Plague are so extremely valuable, that I presume no apology will be requisite for inserting them here, although not strictly part of my present subject. I shall state his general conclusions, the circumstances which led to them, and the outlines of a few cases.

He found by experience that, in every case in which salivation was produced by mercury, the plague bubo suppurated, and the patient recovered.

That in those cases in which salivation could not be effected, the bubo did not suppurate, and the patient died.

That when the patient had many buboes, the suppuration of any one, under the use of mercury, was sufficient to insure a favourable termination of the disease.

That the most offensive and ill conditioned sores from anthrax, on the coming on of salivation, formed good pus, and assumed all the appearances of healthy sores.

Mr. West thought he could distinguish three forms of the Plague which differed in danger and symptoms, but he used mercury in all cases of the disease which he treated from a certain day. The situation, and number of buboes, and their time of appearing, assisted greatly in distinguishing the

forms of Plague. The most favourable situation was in the inguinal glands.

In what Mr. West calls the first form of the disease, being the severest observed by him, the buboes were situated in the absorbent glands and vessels below Poupart's ligament, and often extended considerably down the thigh; they were frequently accompanied by buboes in the axillæ, and in the parotid glands, which were followed by petechiæ, carbuncles, and anthraxs.

In this form of the disease severe general symptoms manifested themselves early, such as great prostration of strength, indistinct articulation, vertigo, tremor of the limbs, and irritability of the stomach, which symptoms sometimes came on early in the first day.

In that form of Plague which Mr. West considered the second, with respect to severity, buboes were often the first symptoms of the disease, but the general febrile symptoms were slight until the fifth or sixth day, and this even when the buboes were situated in the absorbent vessels above or below Poupart's ligament.

In the third, and mildest form of the disease, the buboes were situated exactly in the inguinal glands, and were attended with a fever of a milder form than the foregoing, which fever was, in the first instance, capable of being relieved by a

strict application of the antiphlogistic regimen. But this was not sufficient to cure the disease: It was necessary to promote the suppuration of the buboes by the use of mercury, in order to prevent the recurrence of fever, and to complete the cure of the disease.

Mr. West found that by the application of poultices and other means independent of mercury, serous or bloody discharges might be produced from the buboes, but that those discharges were not connected with the cure of the disease, while true suppuration was so invariably.

Mr. West observed that if the buboes were opened either after death or during life before suppuration, whether the disease was mild or severe, they presented a cheese-like appearance, resembling the diseased bronchial glands in those who die of phthisis pulmonalis.

Within a short period after Mr. West's appointment to the Peste Hospital, he lost five patients, and although cataplasms, fomentations, and other means were used to promote the suppuration of the buboes, not one suppurated in those patients. No mercury was used. Shortly after these disappointments, the first of the following cases occurred, which suggested that plan of treatment which Mr. West followed during the remainder of his continuance in the hospital, with various success.

CASE 1.

A soldier of the 92d was admitted, having a bubo in the absorbent vessels below Poupart's ligament, extending about five inches down the thigh. His fever commenced with moderate symptoms. This man had an ulceration of the lower eyelid, which spread rapidly, and in appearance resembled a venereal ulcer; this circumstance induced Mr. West to use mercury freely. The patient's mouth became sore on the 6th day, before alarming symptoms of general fever came on. The bubo suppurated on the 9th day. The febrile symptoms, which were of a typhoid form, attended with delirium, disappeared, and he recovered.

CASE 2.

— Bromley, wife to — Bromley of the Coldstream regiment of guards, was admitted into the Peste Hospital at Rosetta, on the 23d of May, 1801, having a bubo in the inguinal glands of the right thigh, with slight febrile symptoms of an inflammatory nature. She said the bubo had appeared three days before her admission. On the sixth day after the commencement of the bubo, the febrile symptoms were considerably augmented. Her disease was treated by the antiphlogistic regimen to the fullest extent, and she was free from fever on the 12th day. The bubo, meantime, encreased in size. Cataplasms and fomentations had been constantly applied ever since

her admission, in order to produce suppuration, but without effect. Mr. West therefore opened the bubo to some extent, but no pus nor fluid was contained in it. The enlarged gland had the cheese-like appearance above-mentioned. Stimulating dressings and cataplasms were used, with a view to suppuration; but a serous bloody discharge, having an offensive smell, came from the opening. The diseased gland was affected with pain. This was followed by a return of the inflammatory febrile symptoms, with much headache. The antiphlogistic regimen again produced relief on the fourth day of this new accession of fever. The size and discharge of the bubo remained unaltered until the twenty-first day, when, fearing a return of fever, Mr. W. had recourse to mercurial frictions and calomel, supporting her strength, which was now considerably reduced, by wine and bark. In five days after the commencement of the mercurial course, her mouth became sore; the bubo then discharged thick pus, healed readily by simple dressings, and without any return of fever.

CASE 3.

Surgeon Halliday, of the 27th regiment, was sent to the Peste Hospital on the 11th of June 1801, at his own request. He had had a full conversation a few days before with Mr. West, who stood at a window of the hospital, and had expressed great confidence in the efficacy of mercury

in the Plague, as ascertained by the latter. He had sent in several cases of Plague from the 27th regiment, then quartered at Rosetta. He had the Plague in the severest of the above described forms. The first appearance of the disease, was a bubo which was observed the day before his admission, and by that time had extended in the absorbent vessels of the left thigh seven inches from Poupart's ligament downward. This alarming appearance was accompanied with great prostration of strength, indistinct articulation, tremor of the extremities, a pulse quick, and irregular running on with extreme rapidity for several successive beats, and then returning to the velocity of a febrile pulse. He was affected by giddiness, followed by furious delirium; the skin was dry, the tongue was parched and brown, the stomach irritable. Such symptoms, occurring early on the first day, gave every ground to expect a most severe disease. Mercury was diligently and extensively employed, but salivation could not be produced. His delirium recurred with great severity, but he seemed at first capable of partially restraining it, when earnestly called on to do so. He enjoyed intervals of perfect self command, and sat up dressed to take some coffee with satisfaction on the evening of the second day. But at midnight of the third day, after a fit of delirium, in which it was difficult to restrain him from dashing himself against the windows, while exerting a high degree of muscular strength, and raising his voice to a high pitch, he instantly

sunk into a state compleatly moribund, and died soon after. The remaining brief notes of Cases were communicated by Mr. West, principally with a view to the contagion of Plague, but as the events corroborate the opinion of the efficacy of mercury, I think it well to mention them here.

CASE 4.

— Hartley, wife to sergeant Hartley of the 44th regiment, was sent in with the Plague ; she used mercury, salivation was produced, the bubo suppurated, and she recovered.

CASE 5.

Sergeant Cowan, of the 13th regiment of infantry, was sent into the Peste Hospital labouring under the Plague ; he said the bubo had appeared three days before, but he had concealed it. He used mercury, but salivation could not be produced, nor did the buboes suppurate. He died on the eleventh day.

CASE 6.

Sergeant Cowan's wife was affected with Plague on the same day that her husband had gone into the hospital ; she was also admitted, salivation was induced by mercury, the bubo suppurated, and she recovered.

It is of consequence to notice the circumstances of Mr. West's Peste Hospital, and of the party

which was so fortunate in escaping the Plague themselves, and in effecting cures in so great a proportion as that of three fourths of all the sick. Knowledge is promoted by comparing the circumstances under which remarkable events occur; and when a sufficient number of such coincidences are observed, we may begin to conjecture respecting their causes. The house occupied by Mr. West and his party was a roomy building, situated on an elevated bank over the Nile, exposed to the north west sea breeze. The whole party was temperate. The servants were Arabs, who drank only water. Mr. West and the other Europeans were very attentive to cleanliness, and Mr. West made it a practice to dip his hands in camphorated vinegar before each visit. His deep interest in the discharge of his duty, and the improvement of his profession, must have contributed to turn his mind from the selfish melancholy contemplation of his personal risk, a risk, which one of our best officers fairly compared to that of an hundred battles. Such has been the triumph of good sense, temperance, firmness, and industry, and Mr. West has earned a civic crown which some men will venture to compare with the laurels of the greatest conquerors.

There is some reason to suspect that the plague which formerly visited these countries has been gradually softened down into the disease which we now call Typhus.

Sydenham observed that the Plague seldom raged violently in England oftener than once in thirty or forty years : some here and there die of the Plague for some years after a notable pestilence, and it is wont to go off gradually. The fevers that reign a year or two after a deadly Plague are wont to be pestilential ; and though some have not the tokens of the Plague, yet are the fevers much of the same nature, and require the like method of cure.*

The accessions of Plague and Typhus are similar, in those cases of Plague where buboes do not appear ; indeed the whole course of this form of the Plague is very like a severe Typhus. If we can depend on the accounts we have heard from the Levant, some epidemics of the Plague are scarcely more fatal than Typhus among gentlemen's families.

Typhus and Plague scarcely differ more than some varieties of Small-pox or of Scarlatina do from others. Perhaps we are wrong in flattering ourselves that the circumstances of society are so altered, that we can never again be visited by the Plague ; the truth may be, that we have become inured to a mild state of its Contagion.

The resemblance of Plague and Typhus gives some strength to the opinion that Typhus is contagious, even if we suppose these diseases to differ in

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* Syd. Whole Works, Lond. 1705. p. 59.

species, and not to be merely varieties of the same. This presumption is confirmed by the history of Typhus itself.

If Typhus was not contagious, we should expect that when it is prevalent it should occur in different families indiscriminately. If, on the contrary, it was contagious, we should expect that more individuals should be seized in those families where it had already appeared than in others, and this is what has been observed in Dublin, as well as in other cities of the United Kingdom. It may be stated as a well established general observation, that Typhus runs through families. The physicians who have practised extensively among the poor, have observed that this disease sometimes affects every individual of a family in which it appears, frequently the majority, and often produces one or more relapses in several of the family. There is a certain degree of grouping of disease, which cannot be fairly referred to mere casualty ; and this assertion depends on the same principles of the doctrine of chances, as those which prove, that the odds against throwing the same cast of the dice, many times successively, are enormous.*

* From the year 1795 to 1803, I attended the South-east district of the General Dispensary, and saw much of the fevers of the poor. I was satisfied that this disease spread through families ; for instance, Laurence Gilligan, No. 13, Stocking-lane, a scavenger, was seized with symptoms of Fever in May 1800, while working in Carter's Alley. His son informed me there was a very offensive smell from the mud that day. The father had, after two relapses, died before the family applied to the Dispensary. I visited them July 4th, and took notes that

I shall now state some of the objections against the opinion that Typhus is contagious. Without apprehension that some may say, I am an injudicious

day of the number of fevers and relapses that the family had suffered. The family had consisted of the man and wife and 7 children, the eldest child 24, the youngest one year old. Every one of the survivors had suffered one fever and one relapse before I visited them, and several relapses took place afterwards, although no other individual died.

So far I have stated from notes taken at the time ; and I can add from recollection, that after the room in which this family resided was whitewashed, no more relapses took place.

July 17 of the same year, I attended William Freeman, No. 8, Moss-street, he had had a fever, his wife a fever and relapse, seven children had each had a fever, and four had relapsed.

About the same time I visited Ryan and Kelly, who lived with their families in a cellar, No. 21, Aston's-quay ; a fever successively attacked every member of both families except one, and they had several relapses.

I shall now mention a circumstance from memory, which should, I think, impress this truth, that the safety of the first man in the country is endangered by the sickness of the poor : a crowded family, having a shop in Moss-street, was visited by fever ; I attended some individuals of the family ; the progress of the disease was remarkably rapid and severe ; one or two of the family died.

Sometime after I attended a child that had a languid recovery from fever ; the most of the family had the disease ; they lived on the Quay near Moss-street. I found reason to suppose they had received the Contagion from the family in Moss-street, in which the disease had been so severe ; I saw this family which had been fully infected by the worst Typhus, employed in making up shewy liveries, which they assured me were intended for the servants of the Lord Lieutenant of that day. The event happened about seventeen years ago.

advocate, and need not have stated such strong arguments against the opinion I espouse. I have taken no opinion for better for worse ; I am no advocate, but an inquirer ; let every man state the facts he has observed or collected fairly ; if he reasons from them ill the mischief is curable ; the facts carefully collected and honestly stated, must bring us to agreement at last. They are of more value than any man's conclusions.

It is very probable, that the bodies of those who die of Typhus do not after death produce contagion ; schools of Anatomy have often been supplied with such bodies, and no Typhus produced among the dissectors.

It sometimes happens that the mother does not infect the child, who sucks her, with Typhus, though she herself dies of it ; and sometimes the child sickens with the disease and does not affect the mother who nurses it. Sometimes also grown people suck the breasts of women ill of the worst Typhus, and yet escape taking the disease.

I would not fill my pages with such accounts, so very similar to what has been so often published by others, but that it may be thought, I published too much from books. It is true there is much antiquated rubbish in books relating to our profession, and to other professions ; yet reading is useful, it excites to inquiry and observation, and gives us possession of a vast store of valuable facts. In so uncertain an art it is better to use every means of information diligently, than to lose our time in disputing which is best, so that I shall say no more of the matter.

These things may, in some measure, excuse the incredulity of those who reject the opinion of contagion; but no one doubts that the small pox is contagious, and yet there are individuals, perhaps one twentieth of the human race, who are incapable of receiving that contagion. The dry wind in Naples prevents the communication of variolous contagion, and mental impressions bring on the disease. In short, there is scarcely any objection which has been urged against the contagion of Typhus, which might not be alleged also against the contagion of small pox, although with far less force; the instances on which these objections are grounded being rarer in the case of small pox.

It may indeed be observed generally respecting all questions which do not admit of strict proof, and are embarrassed with difficulties, that it is unwise to pin ourselves on a particular point of the question; it is unreasonable to say, this particular fact is enough for me; if this is not explained to my satisfaction I will believe nothing. The man who thus intrenches himself is acting on the defensive; he is excusing error or singularity, not fairly searching for truth.

Those who deny Typhus to be contagious, arguing from the escape of many who attend the sick, or are otherways exposed to contagion, if it exist, should make up their minds how far they will follow that sort of argument, and how far they will depend upon it. Will they say that this is a decided objection, so that wherever such escapes take place, the dis-

ease is not contagious? Is small pox contagious? In epidemics of small-pox individuals escape. But they are very few. True. After inoculation was in use, an individual of a family has the disease, the rest handle it and escape. But they had been inoculated before; True, and that protects them, you know not how, although small-pox is contagious. Now may not some other cause protect the attendants on a patient labouring under Typhus, you know not how, although Typhus may be contagious?

Will these gentlemen apply the rule, that escapes are decided evidence against Contagion, to determine whether Plague be contagious. In Peste Hospitals it has happened, that a while some of the medical officers shut in took the Plague, some escaped taking it. Is their escape sufficient to prove the Plague not contagious? or would it be sufficient that if all had escaped? Mr. West, with two Europeans, and some Arabs, was shut up in a Peste Hospital four months, yet they all escaped taking the disease. Now let those gentlemen tell us whether Plague is contagious or not; if they say not, their authority can not do much mischief in Ireland, so well are all well informed people convinced of the contrary. If they say the Plague is contagious, but Typhus not, they should explain on what ground they disregard these escapes in the case of Plague, yet argue from them so decidedly in the case of Typhus.

The time, which Typhus requires to spread through a large family, has been supposed to afford an argument

against its being contagious. Thus in a family of twelve, the disease has been known to visit eleven individuals, and three months have passed before the family were free from disease. The opponents of the opinion of contagion suppose that, if the disease had originated from contagion, all the family would have been affected in a shorter time. I might reply, that the contagion of Typhus is feeble, and often inefficient, unless exciting causes co-operate; these vary in different persons, and hence may have arisen much difference in the dates of their sickening, also that the latent period may have extended in some to a month or upwards, and that these, or other unnoticed causes, may have contributed to the long duration of disease in the family. An advocate for contagion may argue more plausibly from the same set of facts. In the general course of the epidemic, in the the district in which this family resided, one out of seven took the fever. Had the family consisted of fourteen it might have been said, before the epidemic, that if two of that family sickened they bore only the average share of the general calamity; in the family of twelve, the sickening of two would have been more than their average share, and the sickening of eleven so much more, that the chance against that event would have been nearly, 189,600,000 to 1*.

* I proposed the following problems to a friend particularly acquainted, with this species of computation:

Problem the first.

An epidemic prevails so severe, that one out of seven sickens. A family of twelve is selected in a particular district, before the

An event then has happened contrary to antecedent probability. If this family had been no more exposed to the general causes of disease than their neighbours, the question naturally arises, has the sickness of the first contributed to that of the second, the sickness of the first and second to that of the third, and so on.

It must be allowed that is possible, and the sickness of the different individuals may be connected by various means. Contagion is one. If on a fair view of all the means by which the illness of one of the family may affect others, contagion appear the most likely, its existence acquires a degree of probability from that single case. If many such cases occur, or cases nearly as strong, the probability strengthens. If these cases bear a considerable proportion to the whole number of cases in any epidemic; the probability becomes so strong as to be a motive of action,

epidemic has visited it; what is the chance that eleven out of that family shall take the disease, supposing the sickness of one of the family, does not promote the sickening of another, and supposing the family not unusually liable to disease?

Answer, the probability against the event is, 189,600,000 to one, if the population amount even to seven thousand.

Problem the second.

The same general conditions being assumed, and also that the number of the inhabitants in the district in question is seven thousand. What is the chance that in any family of 12, within the district, 11 will sicken?

Answer, it is above 300,000 to 1 that no family of twelve persons in a population of 7000 will have eleven sick.

All this according to the conditions that the sickening of one does not promote the sickening of another.

and a guide to the conscientious execution of the duties of benevolence.

Some physicians, in arguing against the contagious nature of certain fevers, have ventured the adoption of a principle which appears to me very untenable, namely, that a disease can have but one cause, and hence they infer that the advocates of Contagion, instead of supposing, as they do at present, that Contagion is the general cause of fevers with which famine, filth, damp, or cold co-operate singly or collectively, should suppose that one only of these causes can be the true cause of every particular disease, and that the admission that other causes contribute to disease, is in fact a confession that Contagion does not.

This supposition of a single cause of the effects we witness, is quite unsupported by nature. Every animal, every plant, every rock requires for its production the co-operation of many causes that we know, and most probably of many more that we have not yet discovered. All nature depends ultimately on a single cause; but it has pleased that Almighty cause, that the effects which concern us immediately should arise from the co-operation of several of his creatures.

Many reasonable persons are led to doubt the contagious nature of our common Typhus, and even of the present epidemic, from observing that the disease seldom selects a second victim among the

families of the opulent ; thus reversing the argument by which I have endeavoured to prove it infectious among the poor. But first let us examine the state of facts. I allow it is very rare that Typhus runs through opulent families, but I have heard of several instances of it. I knew an instance of a lady who died of Typhus, and it was said that every female friend or servant who attended her were seized shortly after with dangerous fevers. This case occurred about 30 years ago. The present epidemic has afforded too many instances of the disease spreading through families in comfortable circumstances ; in one family of that description, living in a town within a few miles of Dublin, the whole family were successively affected, although the epidemic only affected one in thirty. The fever which affected the London magistrates in 1750, will not readily be forgotten ; nor the Black Assizes at Oxford, where, according to Stowe's Chronicle, few escaped being taken ill, and 300 died in Oxford, and 200 more having sickened in Oxford died elsewhere. The most probable opinion respecting the contagious nature of our Typhus appears to me to be this : that it is contagious in a slight degree ; but that its contagion is more manifest in the families of the poor, because they are more exposed to the exciting causes of the disease, such as filth, damp, cold, and famine, and often sleep in the same bed with the sick.

It has been also objected that physicians, clergymen, and nurse-tenders, are seldom affected. It appears, however, that the physicians and nurse-

tenders of the Fever Hospital in Cork-street, and also of the House of Industry, have suffered so frequently, as to shew that they have no exemption from disease, on which any argument can be grounded.

It will be found, on enquiry, that a great proportion of medical men have suffered from Fever, either during their studies, or shortly after commencing to practise. Nor are the cases in which clergymen appear to have received contagion during their attendance on the sick by any means rare. With respect to the present epidemic, we have melancholy proof, that clergymen and medical men are by no means exempted. The deaths from fever recorded in Saunders's News-Letter from August 1st to December 12th, inclusive, are sixty-four, and of these nineteen are of clergymen of some of the different persuasions, or of medical men of different descriptions, which appears greater than the proportion which these two classes of society bear to the whole of those whose deaths we may suppose were mentioned in that manner.

On the question whether the Yellow Fever is contagious, opposite opinions have been maintained, with more heat than becomes philosophical enquiry. If we can rely on Dr. Chisolm, the Epidemic of 1793, at Grenada, may be traced to the Hankey, which arrived on the 19th of February of that year. The fatality of the first cases of those who were taken

ill after visiting the Hankey ; the successive progress of the disease among the ships in the harbour for two months ; its then appearing on shore first in a house where sailors' clothes were washed ; its progress through the town and garrison, afford strong presumptive proofs of the contagious nature of that particular epidemic.

Dr. Chisolm's opinions have been combated, and even his facts questioned, with a degree of eagerness which convinces us, that had he made any important mistakes in his relation, industry was not wanting to set him right ; yet the success of that attack has been so minute, and on points which bear so small a part of the stress of his argument, that his authority seems to have been rather proved than shaken in the trial.

Many respectable writers have given their opinions that Yellow Fever is not contagious, but in Science truth is not always with the majority. On the supposition that the Yellow Fever was produced partly by Contagion, but chiefly by that state of the constitution which arises from the change from a temperate to a warm climate, it must be expected that in some epidemics, and particularly in the advanced periods of some epidemics, the influence of Contagion should be scarcely perceptible.

On the contagious nature of Typhus and Yellow Fever it is highly desirable to form opinions, as

the safety of our fellow creatures is deeply concerned ; but as these opinions rest on conjecture, and the reports of others, we should propose them with modesty.

Medical men who differ in their opinions respecting Contagion, may yet consistently agree in their treatment of Typhus, and even co-operate in a system of measures for preventing its extension. Indeed it can very seldom happen, that the practice of any reasonable man, in treating an individual labouring under fever, depends in the least on his opinion for or against its contagious nature ; and with respect to prevention, all are so entirely agreed that cleanliness and ventilation are necessary to the preservation of health, that they may be expected to co-operate in all measures tending to those objects. These who adopt the opinion of Contagion may expect indeed a double benefit.

The phenomena of Contagion may be reduced to laws which, though not perfectly regular, are sufficiently constant to deserve attention. 1st. Contagion is conveyed either directly, by the diseased body touching a healthy body, or indirectly, by some substance which has touched the diseased body, and is afterwards applied to the uninfected. The latter has been called a *fomes*.

It has been supposed that Contagions may become more active, by continuing for some time in certain

inanimate substances. This does not however appear to have been proved by sufficient evidence. The opinion may have arisen from this circumstance, that some very severe epidemics seem to have been conveyed by inanimate substances infected, and long confined; but we should recollect that all Contagions act more violently in districts where they have not appeared for a considerable time. Now it may happen, that infected substances, being packed and conveyed to some distant part, may have been opened among those to whom the Contagion was new.

Dry air does not appear to convey Contagion to the distance of many feet. This has been more distinctly proved with respect to Small-pox than any other *virus*. Dr. O’Ryan made the following experiments at Lyons, which seem satisfactory. A large dossil of cotton, soaked in variolous matter, was placed in the middle of an oval table, whose least diameter was three feet; six children, who had never had the Small-pox, were seated around it. This experiment was sometimes conducted in the house, and sometimes in the open air: the *virus* was renewed every second day: it was sometimes taken from the inoculated, sometimes from the natural Small-pox. The experiment was also varied by substituting lint, silk, and wool for cotton: the process was repeated three times a day, and for one week, without producing the disease in the children. They continued well for many succeeding months. Nine months after, four of the children had a mild Small-pox, surely

from some other source of Contagion. As it might be supposed the *virus* was less active when spread upon cotton than when directly issuing from the body, a person in the Eruptive Fever of Small-pox, by inoculation, was placed about half-a-yard from four children. The exposure was continued daily for one hour during a fortnight, notwithstanding which none of those exposed received the infection.

Similar experiments were made on the blood of those labouring under measles, and also on the slimy matter which flows from the eyes and from the nostrils in that disease, and without communicating the disease.

During an epidemic of a Plague at Aleppo, Dr. Russel resided in a house which was shut up, and the family of it secluded from intercourse with the inhabitants of the town. He prescribed daily to hundreds of persons labouring under the Plague. He stood at a window of the first floor, not many feet above the heads of the crowd; yet neither he, nor any person in the house, received the Contagion, nor was his conduct objected to by the residents of the house. Indeed it is evident that if the Contagion of the Plague could be conveyed to any distance by the air, the practice of seclusion in great cities could afford no security.

The knowledge of this property of Contagion is of the greatest consequence to the interest of huma-

nity, as it may encourage the benevolent to afford their assistance, by their advice, or directions, in situations in which ignorance of this principle might have deterred them from acting.

2. Contagion seldom produces its effects immediately. The interval between the reception of Contagion and the appearance of its manifest effects, may be called its latent period. This period is of very different lengths in different contagions, and in different states of the same Contagion. One of the cases in which the duration of the latent period varies least, is that of the Inoculated Small-pox ; the interval between the insertion of the matter, and the accession of a slight fever, being about seven days. The Contagion of Small-pox, taken spontaneously, seems to be about fourteen days latent. The latent period of the Measles is perhaps the same. I noted one case in which the patient had been exposed for a few minutes only to the Contagion of Measles, at least no other exposure was observed, and, exactly fourteen days after, she sickened, with a Catarrhal Fever, which brought on the disease. Lues is latent, in some instances, for a few days only, in others for weeks. Haygarth says, the latent period in Scarlatina seems to be seven days. In Hydrophobia there is too much reason to apprehend the latent period sometimes extends beyond a year. In the Plague, Bertrand says, that thirty-five days was the longest period during which the disease was latent in the human body.

In order to determine the latent period of any disease, we should endeavour to collect as many cases as possible, in which the patient had been exposed to Contagion for very short periods ; the sum of all the observed intervals between the reception of Contagion and the accession of Disease will give the average of the latent period, as in any other case in which average quantities are sought.

But if such cases are not to be collected in sufficient number, it will answer tolerably to take cases, in which the exposure had continued for a few days ; and reckoning from the middle point of time between the commencement and conclusion of the exposure, to the accession of the disease, as the latent period of each case, take the average as before.

I should not have stated principles of approximation so obvious as these are, but that they have been unaccountably overlooked by some writers on Contagion, who possess, and even deserve celebrity.

Although we could select a considerable number of cases, in which the patient was exposed to Contagion merely for a moment, there would still remain many sources of error, which are best avoided by taking the average of several observations. The operation of exciting causes seems to be the principal of those sources of error, as they seem capable of shortening the latent period.

Lues is one of those diseases in which the latent period is most distinctly observable ; and observations teach us, that the latent period of this disease may be abridged by fatigue, by exposure to cold after heat, and particularly by the reception of febrile catarrh. There is also little reason to doubt that the latent period of Typhus is abridged by the two former of these causes ; and it is highly probable that, in many cases, the contagion of this disease would have failed of producing the disease, but for the co-operation of the exciting causes.

The latent period seems analogous to the state of the constitution of those who have been exposed to the causes of Marsh Fevers. Labourers, who have gone for work to marshy countries, which are known to produce intermittents, have sometimes preserved their health while they continued there, and yet have been seized with intermittents after their return to healthy countries. Similar observations have been made respecting the Walchern fever.

The enquiry into the latent period of Contagion is not without practical utility. The duration of the quarantine of persons depends directly upon the latent period. Besides, if the accession of disease could be foreknown, the constitution might in some degree be prepared for the attack.

The latent period of most diseases is not a period of perfect health. In the latent period of constitutional Lues, depression of spirits, and a disposition

to general perspiration, are common. In the latent period of Typhus, terrific dreams and depression are observed.

3. It is not the least assignable exposure to contagion, or, in other words, the least particle of contagious matter applied, that produces disease. A sufficient dose of the poison is requisite for the effect; and more than is requisite appears to render the disease more severe.

A sufficient dose, however, seems very different in different diseases, and in different varieties of the same disease, and even in different circumstances of the patient. It appears, from the first writers on the Venereal Disease, that it was at first communicated by any species of contact, and the variety usually called Sibbens, still affects some secluded tribes of mankind in the same manner. It is therefore probable, that the human constitution is less liable to this disease in those societies of men where it has prevailed for centuries, and that a dose of the virus formerly capable of producing the disease by common contact, can now only produce it by contact with those parts where the cuticle is thin.

4. Many individuals appear to be exempt from the influence of particular contagions. This is most apparent in those of Variola and Rubeola. This apparent exemption may in some cases arise from the circumstance of the person who appears to possess

it having suffered the disease before, either after birth, in so slight a manner as not to attract attention, or even in the womb, of which a few instances have been observed in each of the above mentioned diseases.

The exemption from Contagion is sometimes temporary, depending in some cases on the state of the atmosphere. Thus, in the South of Italy, dry winds seem to suspend the activity of the variolous *virus*; but this temporary exemption seems oftener to depend upon the state of the individual.

5. Contagion seems to produce less severe effects when gradually communicated. They who have inhabited a city from the commencement of a particular Epidemic, appear to suffer less severely than those who have arrived from other places. In this particular, Contagion is analogous to many poisons, which lose their effect when applied gradually.

6. Many Contagions seem scarcely ever to affect the human constitution a second time. This circumstance is most distinctly to be observed in the Contagions of Small-pox, Measles, and Hooping Cough. It is, however, of great importance to know, that this exemption from the recurrence of Small-pox, although almost universal, is by no means absolutely so. The want of attention to this circumstance produced much embarrassment and unnecessary discussion, during a few years after the publication of Dr. Jenner's Observations on Cow-pox. Plague seldom

recurs ; Mr. West did not observe an instance of it, although the convalescents in his Hospital sometimes volunteered to attend the sick.

Some other diseases, when they do recur, are usually milder than in the first attack. Scarlatina seldom recurs in that perfect form in which a Scarlet eruption is accompanied with sore throat, twice in the same patient. Typhus is much more apt to recur than the contagious diseases just mentioned ; yet it is not uncommon to meet with persons who, after having suffered a severe attack of Typhus, have been exempt from the disease for many years, although exposed to its Contagion.

Again, there are some Contagions which seem to affect as often as they are applied, as those of Lues, Psora, and others.

7. The part of the body infected modifies, in some cases, the subsequent disease. This appears distinctly in Lues, and less so in Variola.

8. The different Contagions sometimes combine their effects, and sometimes interfere with each other. Small-pox and Measles occasionally interfere with one another, the one being suspended while the other runs its course. Du Pui, in Schlegel's Thesaurus, mentions that these disorders affected different parts of the body at the same time. Small-pox and Scarlatina have appeared together in

the same individual, and proved fatal ; of this Withering relates two cases. The contagion of Small-pox appears to have influenced the epidemic of Dysentery, which even seems to have been produced in persons exposed to Variolous Contagion who had had the Small-pox before. Sydenham observed, the prevalence of Variola appeared to have influenced the prevailing epidemic of Typhus ; and it is even repeatedly found, that during the prevalence of *per-tussis*, Catarrh has assumed some of the appearances of the disease.

9. Many Contagions are confined in their effects to the species of animals in which they originate, as Measles, Scarlatina, Hooping-cough : others pass from one species to another, as the Mange.

In order to determine the best mode of restraining Contagion, it is very useful as speedily as possible to ascertain the extent of the epidemic, and whether it is encreasing or not. For this purpose the returns of Hospitals are not sufficient, the entire number of the sick of the epidemic disease should be known and reported at short intervals, and all the deaths. This is particularly necessary, as the measures of precaution must vary with the severity of the epidemic. In a Fever Hospital newly opened, suppose for one month, the proportion of registered deaths to cures will exhibit a fatality greater than that of the epidemic ; for while the deaths in Typhus usually occur within the first twelve days, the recovery is seldom

complete before the 30th. The deaths, therefore, are registered before the recoveries : therefore, of the numbers registered at any one time, the fatal cases are in a proportion too great to express the mortality of the epidemic. Independantly of this circumstance, a new Hospital, until it obtains the public confidence, has usually an over proportion of severe cases.

The means of preventing or mitigating the effects of Contagion, may be reduced to *four* principal heads. 1. The destruction of the matter of Contagion, or the separating of it from infected substances. 2. The separating the infected from the uninfected persons. 3. The avoiding the exciting causes of the disease. 4. Inoculation. First. The destruction of the matter of Contagion can scarcely be effected with perfect certainty, but by destroying the infected substance itself. There is no good reason to apprehend that while the infected substance is consumed by fire, the matter of the infection should be conveyed through the air to the operators, as Contagion does not pass to any sensible distance through dry air.—(See page 30.)

When infected substances are destroyed, the proprietors should be fully compensated ; this justice requires, and true policy recommends, as by this means the temptations to evade or resist authority on this subject are greatly diminished. The goods that most frequently require to be destroyed, in order to prevent the spreading of Contagion, are clothes,

bedding, and houses, especially when built of wood.

It is probable, however, that the matter of Contagion may be destroyed without destroying the infected substance ; this, it is supposed, may be done by the application of a certain degree of temperature, namely, such a heat as is usually considered sufficient for the baking of bread ; or the same may be done by immersing the infected substance in boiling water. Lind, indeed, supposed that he observed Contagion to be communicated by the steam of boiling water in such a case ; but it is as likely the communication may have taken place in consequence of the operator's handling the clothes to be purified.

When substances require to be purified by any of the methods here mentioned, they should not be handled by the assistants, but lifted up by iron-hooks or tongs. If there was good ground for apprehending that steam might convey Contagion, this danger might always be avoided by well-constructed flues, which should give the current of air and steam a proper direction.

Immersion in cold water, although it may be less powerful, is probably useful, and perhaps may be conveniently made the first step in purification : in most cases, a stream of water is to be preferred, when it can be used.

Various acid gases have been employed for freeing infected clothes or buildings from the matter of Contagion ; in what manner they act is not known, but that they do effect the purpose, there is some reason to believe. The gases most powerful seem to be, 1. The Oxymuriatic acid or Chlorine. 2. The Muriatic acid. 3. The Nitric. And 4, that produced by the burning of Sulphur.

To produce the Oxymuriatic acid gas, Dr. Thomson directs to employ 3 parts of common salt, 1 part of black oxyde of Manganese in fine powder, and 2 parts of concentrated sulphuric acid, previously diluted with its own weight of water. These ingredients should be mixed in a vessel on which they will not act, when an extrication of the gas will take place ; but in order that the whole of it should be liberated, a moderate heat should be applied. If a room is to be purified, all the apertures, except one door, being closed as carefully as is practicable, the materials should be mixed and exposed to heat ; the operator should then retire, and close the remaining aperture. This gas, however, is highly dangerous to respiration ; a considerable and sudden inhalation of it has been said to have produced instant death ; and when inhaled in small quantities for some time, it has been known to produce sudden and most distressing dyspnœa, with a sensation of constriction at the throat. The dyspnœa, once produced, continues for some days, recurring at intervals, and is followed by symptoms of the severest catarrh. This gas also attacks metals, with consider-

able rapidity, and is remarkable for removing the colours from bodies exposed to it.

When clothes are to be fumigated by this, or other gaseous fumigations, it is advised, that they should be ripped open, and exposed on lines to the vapour. In Hospitals or Quarantine-houses, when large quantities of clothes are to be fumigated, a chamber should be constructed for the purpose; the floor, walls, and ceiling should be covered with glazed tiles, cemented with sulphate of lime, or gypsum; the single opening which would be necessary, should be shut with a door of hard wood turning on hinges of the same material, and should be capable of being perfectly closed. Small quantities may be fumigated in a box, which might be shut by a lid without hinges, having a projecting ledge, which might fit into a groove filled with water.

Our reliance on fumigations in general, it must be acknowledged, is in a great measure traditional, and experiments are wanting to prove the efficacy of these means, with the accuracy of science. By one experiment, however, of Mr. Cruikshank's, it does appear probable, that the oxymuriatic acid gas can destroy the contagion of Variola. He took two portions of fresh variolous matter from the same person, and having exposed one portion for a few minutes to oxymuriate acid gas, with it he inoculated the left arms of three persons, and with the other portion the right arms of the same persons at the same time; the for-

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brought into more general use by Tolono, a Capuchin friar, who had great success by these means in the Plague which prevailed at Genoa, in 1657.

Lind had reason to suppose that, in one instance, wood fires, sprinkled with brimstone, had the effect of stopping the extension of Small-pox.

The extrication of these vapours is easily obtained ; pieces of charcoal and brimstone, laid in alternate layers, in an iron pot, when once set fire to, will continue to burn, and produce vapours in great abundance. These vapours, it is generally known, are very suffocating. It may be remarked, that arsenic was anciently used with sulphur in these fumigations ; but there are no strong testimonies of its adding efficacy to them. There are somewhat better grounds for supposing that the smoke from burning wood has some power in destroying Contagion. Some arguments have been adduced to prove that oil protected the body, in some measure, from Contagion. The oil sellers of Cairo, the tallow chandlers of London and Philadelphia, were said to have suffered less frequently than their neighbours ; and in General Baird's army, those who were employed in rubbing the Camels with oil, which was done on account of an eruption, under which they laboured, had less of the disease than other corps in the army.

It must be acknowledged, that our reliance on

the power of acid gases to destroy Contagion, depends rather on tradition, than decisive experiment. In the 17th century, the cities of Italy had acquired considerable skill in checking the progress of the Plague, when imported; and, in some of the most striking instances of their success, fumigations with sulphur had been part of their process. It is not my business to dictate to the public, but to supply them with such information as may be agreeable to them; neither concealing my own opinion, nor dogmatizing upon it. I do not know of any decisive experiment to prove the utility of these fumigations in destroying Contagion; but it is possible they may have been of use: they were part of a process which did succeed, and it may be said, until we can separate the wheat from the chaff, it is not wise to throw out either. Time, however, may be lost in teaching the population of a great city to purify themselves, or their clothes, by Nitric acid or Chlorine, when the business might be as effectually done by soap and water. Mankind are too much disposed to seek for wonders when their feelings are roused, and neglect the safe and simple resources that nature and reason point out. We require the admonition that Naaman received from his servant, "If the prophet had bid thee do some great thing, wouldst thou not have done it? how much more when he saith unto thee, wash and be clean?"

With respect to the intercepting the commu-

nication with the infected, much is already done in Dublin, and in general wisely. We have a Fever Hospital in Cork-street, established by enlightened benevolence, assisted by the liberality of Government, superintended by men of business, intelligent, and indefatigable, attended by Physicians of the first character.

There has been lately opened in this institution a new building, in which the wards are much better constructed than those of the first building.

The economy of this institution is so admirable, that, in most respects, it might answer as a model for similar institutions throughout Ireland. I would only suggest that, in all such institutions, the medical men should not only be permitted, but encouraged to publish reports, containing their unbiased opinions on the progress and character of the prevailing epidemic. This is, in fact, one of the principal advantages which the public derive from such institutions. The Physicians, in such situations, are placed as centinels; until they give the alarm we may repose in security; when they do, we prepare to do our duty.

The humane vigilance of Government has also prepared other asylums for Fever; and at the House of Industry and Steevens's Hospital, these asylums combined may accommodate about eight hundred patients: these asylums are now unhappily unequal to the accomodation of those who apply.

The wards in the House of Industry are well ventilated, perfectly clean, and the attendance seems excellent.

Dr. Harvey has adopted a plan at Steevens's Hospital, which, perhaps, might be advantageously copied in the Fever Hospitals through the kingdom; every fever patient is shaved and bathed on admission.

To complete, however, the separation of the infected and uninfected persons, it is necessary not only to send the infected into Hospitals, but to put the uninfected into clean clothes and clean houses. * When

* The best methods of separating the infected from the uninfected, are in substance the same with those adopted by General Baird in the expedition to Egypt from India. Those plans, we may well suppose, were suggested by Sir James M 'Gregor, then superintending Surgeon to the Indian army. The Indian army traversed Egypt twice between Kozire and Alexandria. They were in Egypt about fifteen months. The inhabited parts of Egypt through which they marched, and where they were quartered, were infested with the Plague. The army consisted of near eight thousand effective men, about half Europeans, and the other native Indians. In every corps of this army, at some period or other, a case of Plague appeared, yet the entire number of deaths from Plague, in fifteen months, was only two hundred and three. Sir James thinks half the loss might have been saved, if the same plans could have been acted on where the medical establishment had been provided with properly constructed houses. Surely the methods which succeeded so well in preserving from the Plague an army moving under such singular difficulties, might protect our towns against a Contagion so much feebler as that of fever, if the confidence of the people could be obtained, and the habits of obedience produced. Even the knowledge of this fact, that such a plan was deliberately devised and success-

an individual of any family is taken ill with a contagious disease, there are two grounds for apprehending

fully acted on, may help to bring the Gentlemen in some districts to unanimous and zealous exertion.

The system of prevention in India, Sir James M'Gregor describes under the following heads :

1. To every hospital an observation room, or in lieu of it a tent was attached, and to it every case whatever with febrile symptoms was sent, as soon as discovered, and was there most strictly watched by the Surgeon.

2. On any symptoms of the Plague appearing, the case was instantly sent to the Peste House from the observation room of the Regimental Hospital; the patient was accompanied by the medical gentlemen of his corps, who attended him, and who gave the medical gentlemen at the Peste House an account of the previous treatment of the case.

If any doubt remained, the patient in the first instance was placed in the observation room of the Peste House, and if the disease did not turn out to be the Plague he was sent to quarantine.

3. In every corps, and in every department, a minute inspection by the Surgeon was made twice a week, and every person with the smallest appearance of ill health was sent to the hospital.

4. Every corps or hospital where a case of Plague had appeared was put into quarantine, and in such corps or hospital an inspection by the Surgeon was made two or three times a day, and every case with suspicious symptoms was ordered to the observation room.

5. In suspected corps it was ordered that under the inspection of a commission officer every person should be bathed more frequently and at stated periods, and likewise that all their clothing and bedding should be frequently washed and baked. To all the hospitals, ovens and smoking rooms were attached.

6. Quarters of corps hospitals, and ground of encampments, were frequently changed.

that others of the family may have the same misfortune. They may have been exposed to the same Contagion which he was exposed to, or they may receive the disease from him. To prevent this danger effectually, it is necessary that baths, clean clothes, and clean houses, should be ready for those who want them.

In every street one or more houses should be ready for the reception of families, whose houses require to be cleansed. The number of houses should be determined by the size of the street, and the severity of the epidemic. These should be put in complete order, and kept perfectly clean and dry, furnished so as to allow of complete cleansing.

The system of accommodating the fever patients of the vicinity of Dublin in the Dublin hospitals, may have been dictated by the noblest principles of humanity, and not objectionable in a mild state of the epidemic ; but at present, when the hospitals are likely to be over-stocked, it seems replete with danger. No care on the part of the conductors of the hospital can prevent the introduction of abundance of infected articles with the sick into town. To prevent this mischief, it might be advisable to encircle town by twelve fever hospitals on the smallest scale.

7. The nitrous fumigation was used in the observation rooms, and rooms from which the cases of the Plague had come. The use of this fumigation, Sir James M'Gregor supposes was attended with the best effects.

Five cabins, connected by clean gravel walks, will be quite sufficient for the beds and the accomodation of the nurses. A medical man might visit three of these daily ; the expense need scarce exceed 1s. per day per bed, and possibly a share might be borne by charitable persons in the immediate vicinity.

The sufferings of Cork, Limerick, Belfast, and so many other towns of Ireland, should teach us the operation of fever hospitals is not of itself sufficient to clear a large town of fever, during such an epidemic as this, although such institutions are indispensable to this purpose. It is obvious the fever hospitals can not remove all Contagion, because all fever patients do not apply to them ; and if they did, the families in which fever has appeared should be cleansed.

While we endeavour to arrest the progress of Contagion in town, we should not neglect to prevent the further introduction of it from the country. Dublin is admirably circumstanced for such an attempt :—The circular branch of the Grand Canal surrounds the city from the docks to its junction with the main trunk. From that junction to the point of the Circular Road, from whence it runs northward to Sarah Bridge, is but a short distance. From thence by the Circular Road, the Park wall, and the Circular Road again to the Glassnevin Bridge, there is a line pretty easily guarded, and from that bridge to the docks the Royal Canal completes the circuit. On

this circuit twelve or sixteen houses might be got ready for the purpose of washing the bodies and clothes of such beggars as wish to come into town. Those who do not choose to submit to so severe an operation may fairly be desired to seek their fortune elsewhere ; those who comply should get a dinner, a dry warm bed, and next morning be dismissed with their old clothes cleaned and dried, and if injured by the washing, a fair compensation should be given. Such measures require great expense, high authority, much integrity, vigilance, and cordial co-operation of all ranks of people. If any of my fellow citizens should deem these extravagant or unnecessary plans, let them take this consolation, that I have not a particle of power to effect them but by the approbation and assistance of themselves. I am not preparing their minds for plans already determined. I have no job to accomplish. I shall be very thankful to providence if the necessity I apprehend does not arise ; very thankful to any of my fellow-citizens who shall improve on these plans, or substitute better. I have merely suggested what appeared to me useful means of protecting my own family, my friends, and my native city from what I consider a pressing danger.

It has been sometimes the practice in severe Epidemics of the Plague, to surround the infected city with a cordon of troops, and prevent the inhabitants from quitting it. This measure has often produced the destruction of the greater part of the population thus shut in. This appears to me an injudicious as well as an inhuman measure. The population thus

shut up, must be fed and supplied at the public expense. This has been found necessary, and this supply must be extended not only to paupers, but to all whose industry is necessary to their subsistence, and interrupted by the Epidemic. If this supply is not afforded, despair would produce insurrection. If the population of an infected city must be fed, it is worth considering, whether a more humane and sufficiently effective method of intercepting communication may not be devised. I hope no person will be shocked at my supposing an event possible which has formerly happened; and I beg it may be remembered, that I am not confining my view of the subject to the present Epidemic of Ireland. With this preface, I will venture the opinion, that if the true Plague should unhappily visit Dublin, it would not be justifiable to shut in its population by a cordon of troops. A much preferable plan, in my opinion, would be to remove the uninfected population, such as are unable to provide themselves, in parties of from one thousand to two thousand to the mountain glens, and support them there. As I am speaking of the poor who must be fed, it should be remembered, that a great saving may be made in their feeding, by removing to the country, sufficient in a few months to pay for their hutting. The barracks in the county of Wicklow might contain half of our five thousand beggars, or the whole of the paupers of the House of Industry, and leave that whole building ready for a Fever Hospital, when necessary.

Before we suffer ourselves to be alarmed at

the weight of these expenses, we should consider what we are to lose if effective measures are not adopted.

Suppose the population of Ireland 5,100,000, of whom we may suppose 5,000,000 of the common people, the rest gentry, we will suppose the epidemic proceeds without interruption, and that one-half from various causes escape sickening. 2,500,000 of the commonalty will sicken, and 125,000 die; 50,000 of the gentry will sicken, and 12,500 die, in all 137,500 lives will be lost by the epidemic, if not checked, although its fatality should not increase.

A disciple of Mr. Malthus may smile at our uneasiness, and tell us there are too many lives in Ireland, but, no man who happens to have four tried friends, will be content to lose one to please Mr. Malthus or his disciples.

A very friendly writer, in a country paper, fairly remarks, that Mr. Malthus, or one of his disciples, may be as anxious for the lives of individuals as others can be. This is possible, because men's hearts are too good for their systems; but I aver, that I have found several valuable persons, whose zeal for the interest of the poor has been paralysed by their attachment to Mr. Malthus's opinions.

But let us indulge Mr. Malthus so far as to allow, that wealth is more valuable than human life,

and consider what the epidemic, if not restrained, will cost in wealth. If $\frac{1}{4}$ of 2,000,000 earn 6d. per day, their labour for six weeks would amount to £450,000. Half that sum may be allowed as the loss from weakness, and loss of situation, and a similar sum may be allowed for the time of those members of the family who are employed in attending the sick. In all 900,000*l.* will be the loss by the interruption of labour, supposing the epidemic to affect the working classes only ; but the death of 12,500 of the upper class must produce such a breaking up of establishments for manufactures, commerce, agriculture, and education ; such a depression of value in property, which the owner only could apply to profit, such a dissolution of the ties which support friendship, peace, and justice in society, that it is difficult to conjecture the pecuniary loss such calamities must produce.

Again, consider the funds we can draw on : 5000 beggars of Dublin are said to earn £100,000 annually, by street-begging. If we can persuade those whose money is thus wasted, to apply one shilling in the pound to hutting the poor in the mountain glens, it will defray the expense of hutting about 20,000, which, perhaps, is more than need be so provided at any one time.

I have made these hasty computations on the supposition that epidemic will not increase in fatality, but this we cannot prudently reckon on ; it has increased lately, and may still more.

Mendicity is a great cause of disseminating Contagion. This has been an observation only too well established in various epidemics. This subject should be speedily attended to. It seems inconsistent to lay vessels from Charlestown under quarantine, and keep the avenues of the city open to beggars, who flock from all the infected districts of our own country. We should, however, enter on this difficult question with a firm determination to let no inconvenience, no danger, drive us from the sacred principles of justice and mercy. If we desert these, God and man will desert us. I cannot see on what principle mendicity is treated as a crime: I admit it is a great inconvenience, at present the source of great dangers; still these do not make it a crime. On the contrary, I am of opinion, it may be a man's sacred, bounden duty, if he cannot otherwise support his children, to beg for them. If, for your own safety, you deprive an unhappy man of his last resource, you are bound by every tie of justice and compassion to give him some compensation. If he must be fed, there is a saving in feeding him where food is cheap; it is cheaper to move a man than so much potatoes as will feed him for three months. If he must be forced to work, or trained to work, the material on which he works ought not to be of high value. These principles seem pretty certain. The affluent, and those who practically know the habits of the poor, should candidly and patiently devise the best application of these principles.

Private families should air, carefully, all articles of

furniture, or clothing brought into the house ; they should occasionally wash their blankets ; and all classes of people should generally avoid crowded places, and keep their servants as much at home as is practicable.

Of avoiding exciting causes I shall say little ; but what I say may apply, not only to the causes that produce the disease, but to those which encrease its danger. It is well established, that in the usual Typhus the common people are more susceptible ; the gentry more in danger. The same observations are usually made in the present epidemic, and peculiarly confirmed to me by a physician in a principal town of the North, on whose general observations I have long relied most strongly.

The greater susceptibility of the poor is probably owing to filth and damp : the greater danger of the rich is not so easily accounted for. The upper classes seem peculiarly liable to diseases of the brain, which organ Typhus attacks often, and in this epidemic very frequently. A gentleman usually uses his mind more, and his body less than a peasant, or mechanic ; he uses more stimulating food and drink, warmer bedding, later hours, and is less in the open air.

If the gentleman, preserving his advantages in cleanliness, and in the dryness of his house, can, in a gradual, prudent manner, assimilate his life to that

of the peasant, in other respects, he will probably enjoy a share of the peasant's security.

The immediate exciting cause of the Typhus, next in importance to Contagion, is exposure to cold after heat, most frequently by sitting in wet clothes. Very delicate persons may be injured by a severe wetting, notwithstanding any subsequent management; but to all those who enjoy tolerable health, the practice of putting on dry clothes immediately on the cessation of exercise, affords sufficient security.

APPENDIX,

No. I.

Extract of a Letter from Dr. M'Donnell.

Belfast, January 7, 1818.

YOUR desiring to publish the observation I made in Rathlin on the possibility of preventing the Contagion of Typhus, gives it an importance that I never attached to it; for indeed I looked on the question of Typhus being infectious as a matter quite settled among all thinking men. I contributed to establish a Fever Hospital here, in 1797, and have practised in it ever since. I have always kept this question in view, and can safely say that the evidence, not only of its propagation by infection, but by that solely, has always appeared to be as clear as that measles, scarlatina or pertussis were infectious; but supposing my observations on this subject for my whole life to be of no value, there are at present before our eyes in this town some of the most conclusive facts. Our hospital contains one hundred and ninety Typhus patients; and, at twenty yards distance, separated by a wall seven feet high, there is a school containing seven or eight hundred scholars. Our poor-house, at two hundred yards distance, contains three hundred persons. A barrack at two hundred and fifty yards distance contains about one thousand soldiers.

Now it is a notorious fact, that this school, the poor-house and the barrack, never were more exempt from fever than at present; and farther, that of six thousand soldiers within this province, there are not at present six men affected with Typhus, although the whole population are full of it. Why is it that these three descriptions of people, so differing in their circumstances, are exempt from the epidemic fever? I answer, because the masters, managers, and officers, have made efficient arrangements to prevent communications between their people and the infected inhabitants; and that this is the sole cause of their exemption, appears from this, that in some former years, I can shew that the schools and the army suffered much more in proportion than the other inhabitants; but I need not enter farther into a question that is so obvious.

I shall now repeat the facts observed in Rathlin, which, you know, is an island, containing about twelve hundred inhabitants, four miles from the north coast of Ireland. In August, 1814, when there was little or no fever on the coast of Antrim, I went to Rathlin, and was surprised to find two families, about the centre of the island, in Typhus. In the first house I enquired in vain as to the origin of the fever; but on visiting the second house I discovered that some of the connexions of the family had died in Greenock; they had gone there to visit the sick, and had brought home the clothes of those who died at Greenock, in a chest, and had taken this disorder soon after their return.

Fortunately for the people, it happens that the proprietor, the rector, the agent, and the priest, are always resident. I had a conversation with them all on the subject, and explained to them my views of the treatment and prevention of the complaint, which soon ceased, but not until several were affected, and three or four died. Since that period until the present date, no case of Typhus whatever has occurred on that island, although it has been very prevalent, as every one knows, on every part of the coast opposite Rathlin.

Now it cannot be said that the exemption of this island arises from the inhabitants being of a different description, being less exposed to cold, heat, fatigue, hunger, bad food, filth, moisture, confined air, and the long list of causes supposed capable of producing this dreadful distemper.

Their exemption arises from the perfect conviction, the people now have, that the distemper is portable, and that it was imported in 1814. This has been often explained to them from the pulpit, although few of them can speak English, and of these only a very few can read, yet they understand this matter, and act on it sagaciously. They provide for all their own poor, and if itinerant mendicants arrive from Ireland or Scotland, they instantly supply them with food, and send them back; and when a native of the island, in November last, crossed the channel to attend a relative in fever, she has not been suffered to return.

I think the fever is more fatal here since the end of November. About the beginning of November there was an evident decrease in the number of cases in most of the towns in Ulster.

No. II.

Extract of a Letter from Mr. Rogan to Sir John Burgoyne.

Strabane, Jan. 2, 1818.

DEAR SIR JOHN,

THE population of Strabane does not exceed 4000, of whom a very large proportion are labourers and mechanics, and the number of this description was still more increased by the scarcity of last winter, which, by depriving them of the means of support in the extensive mountain district in our neighbourhood, forced them into town, where they were kept from perishing, by the exertions made to supply them with food and fuel, by all who had the means of contributing in any degree. It was not till the month of June that Fever began among us. The most prevalent disease before that period was a dropsical swelling of the whole body, often accompanied with dysentery, which attacked the poor almost universally, and was, I think, caused by the bad quality and deficient quantity of their food. The Fever first began in some wretched lodging houses, and from these points it spread through the town, so that about the middle of August more than one hundred of all

classes were attacked by it. The Sessions House was then opened as a temporary Fever Hospital, and in the first week sixty patients were received into it.— From the opening of the establishment till the present date, three hundred and sixty-six patients have been admitted, of whom three hundred and seventeen have been dismissed cured, twelve have died, and thirty-seven still remain in hospital. The mortality has been greater among the sick confined in their own houses, though even among them the mortality has not exceeded one in twenty. The disease in most instances, where it occurred in the higher classes, was confined to the person first attacked, but among the lower orders, it generally spread through the whole family. A much larger proportion of the poor than the rich have been affected, but among the latter the complaint proved more fatal. The number of all classes ill of Fever in town within the last five months, has not been short of six hundred—more than one-seventh of our population. In the surrounding country the proportion of sick, and the mortality, has been still greater; about one-fourth of the residents on the Marquis's estate have been ill, and one-tenth of the sick have died. At present there are ill in town about seventy persons of all ranks; and in the country there has been a diminution of about one-third in the last six weeks.

The plan now acted on here to prevent street begging, is by a monthly contribution from the inhabitants, and the payment of small sums weekly to such of the poor as are found to be proper objects. The

allowance is in proportion to the number of the family, and to their ability to contribute in some degree to their own support. The weekly payments vary from two shillings and sixpence to tenpence, and the subscriptions amount to about thirty pounds per month. There are now eighty pensioners, but the number must be increased, as many objects have not yet been put on the list.

To Mr. Rogan's interesting letter I shall add a few particulars, which I learned from Sir John Burgoyne, the Marquis of Abercorn's agent, in conversation.

The sum of money which supported the charitable exertions of the town of Strabane, during the period spoken of by Mr. Rogan, was eighteen hundred pounds, which was made up by a considerable donation from the Marquis, a subscription among the inhabitants, and some assistance from Government; the number of beggars they had to feed was about sixty; the confinement of these persons to their own lodgings, and the exclusion of strange beggars from the town, were the only compulsory measures which it was found necessary to resort to, and these were effected by the constables, and a patrol of the inhabitants, without any aid of the military. The inhabitants seemed quite convinced of the necessity of these measures, and very willing to have recourse to the hospital, in case of sickness. All industrious

persons were suffered to pursue their business, as usual, and flax was distributed, on security, for spinning, for such as wanted it.

The clothes of all persons admitted into the hospital were washed, first in cold water, afterwards in hot water with soap ; all the straw which had been used in beds in the hospital, was burned every Monday morning. This was an excellent system, and well calculated to avoid neglect or evasion.

Sir John Burgoyne thought it probable that the disease first appeared in the sea-ports, and was diffused through the country by beggars.

Several intelligent persons from various parts of Ireland seem to have formed the same opinion, each from their separate sources of information.

No. III.

From a review of Dr. Russel's cases of the Plague, it appears, with very few exceptions, that when the bubo suppurated the patient recovered. Some also recovered on the bubo dispersing, but hardly any when neither event took place.

This review Mr. West is made in consequence of his communication to me of his own observations.

Those who make due allowance for the life of a Military Surgeon, can well understand that he may not have ever before been able to examine Dr. Russel's work, nor to produce at present more than a notice of his own observations of the numerous cases of Plague which he treated during four months.

No. IV.

Extract of a Letter from Dr. Morrison.

Newry, 16th Jan. 1818.

In September last we began to use mercury, so as to affect the system, in the Newry Fever Hospital, and from its excellent effects, it is now become (in bad cases) our general practice. It has been used here in upwards of one hundred cases, and in all with the best effects—NONE DIED IN WHOM PTYALISM WAS INDUCED.

The connexion between salivation and convalescence appears so strongly marked, that I think the co-existence of the febrile and mercurial actions is almost in every instance incompatible; the one is immediately superseded by the other. The cases were so far selected, that the bad ones were always the subjects for the mercurial treatment; and in those where local inflammation seemed evidently to

have existed, the use of mercury was particularly apparent. In none was this treatment begun with after the eleventh day of fever ; but in many instances the disease was cut short by the sixth or seventh.

Ptyalism was difficult to be brought about in proportion to the violence of the disease. The submuriate of mercury, in doses of two or three grains, three times a day (often with opium) was the form generally made use of. You will make any use of this letter you please.

I am, dear Sir, very respectfully,

Your most obedient servant,

T. MORRISON.

I have seen it stated in the papers, that the mortality of the Newry Hospital is $\frac{1}{30}$. Mercury has been extensively used in Lisburn, and some practitioners are trying its effects in Dublin.

Whatever be the result, the Physicians of Newry have deserved well of their country, in instituting a course of experiments which the imperfection of our methods called for, general views recommend, and which I sincerely hope will be attended by some beneficial result, although it should not be the one we look for.

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